

We claim

1. A process for preparing hydrogen in a fuel processor assembly comprised of a means for supplying a high voltage electrical discharge within said fuel processor, a first catalytic body disposed within said fuel processor, and a second catalytic body disposed within said fuel processor, wherein said first catalytic body and said second catalytic body have different shapes, comprising the steps of:
 - (a) feeding methane, an oxygen-containing gas, and a water-containing gas to said fuel processor, wherein:
 1. from about 4.5 to about 5.5 moles of said methane are fed to said fuel processor assembly for each mole of oxygen in said oxygen-containing gas fed to said fuel processor;
 2. from about 1.8 to about 2.2 moles of water in said water-containing gas are fed to said fuel processor assembly for each mole of methane fed to said fuel processor;
 - (b) maintaining said methane, said oxygen-containing gas, and said water-containing gas within said fuel processor assembly at a temperature of from about 600 to about 1100 degrees Celsius and a pressure of from about 10 to about 70 pounds per square inch for from about 0.1 to about 50 seconds, thereby producing a hydrogen-containing gas; and
 - (c) purifying said hydrogen-containing gas.
2. The process as recited in claim 1, wherein said methane, said oxygen-containing gas, and water-containing gas are maintained within said fuel processor assembly at a pressure of from about 15 to about 60 pounds per square inch.

3. The process as recited in claim 2, wherein said methane, said oxygen-containing gas, and water-containing gas are maintained within said fuel processor assembly at a temperature of from about 600 to about 850 degrees Celsius.

4. The process as recited in claim 3, wherein said methane, said oxygen-containing gas, and water-containing gas are maintained within said fuel processor for from about 1 to about 10 seconds.

5. The process as recited in claim 4, wherein said oxygen-containing gas is air, and said water-containing gas is steam.

6. A process for preparing hydrogen in a fuel processor assembly comprised of a means for supplying a high voltage electrical discharge within said fuel processor, a first catalytic body disposed within said fuel processor, and a second catalytic body disposed within said fuel processor, wherein said first catalytic body and said second catalytic body have different shapes, comprising the steps of:

(a) feeding methane, and an oxygen-containing gas to said fuel processor, wherein from about 4.5 to about 5.5 moles of said methane are fed to said fuel processor assembly for each mole of oxygen in said oxygen-containing gas fed to said fuel processor;

(b) maintaining said methane, said oxygen-containing gas, and said water-containing gas within said fuel processor assembly at a temperature of from about 600 to about 1100 degrees Celsius and a pressure of from about 10 to about 70 pounds per square inch for from about 1 to about 10 seconds, thereby producing a hydrogen-containing gas; and

(c) purifying said hydrogen-containing gas.

7. The process as recited in claim 6, wherein said methane and said oxygen-containing gas are maintained within said fuel processor assembly at a pressure of from about 15 to about 60 pounds per square inch.

8. The process as recited in claim 7, wherein said methane and said oxygen-containing gas are maintained within said fuel processor assembly at a temperature of from about 600 to about 850 degrees Celsius.

9. The process as recited in claim 8, wherein said methane and said oxygen-containing gas are maintained within said fuel processor for from about 5 to about 10 seconds.

10. The process as recited in claim 9, wherein said oxygen-containing gas is air.

11. A process for preparing hydrogen in a fuel processor assembly comprised of a means for supplying a high voltage electrical discharge within said fuel processor, a first catalytic body disposed within said fuel processor, and a second catalytic body disposed within said fuel processor, wherein said first catalytic body and said second catalytic body have different shapes, comprising the steps of:

(a) feeding methane and a water-containing gas to said fuel processor, wherein from about 3.6 to about 4.4 moles of said water in said water-containing gas is fed to methane are fed to said fuel processor assembly for each mole of methane fed to said fuel processor;

(b) maintaining said methane and said water-containing gas within said fuel processor assembly at a temperature of from about 600 to about 1100 degrees Celsius and a pressure of from about 10 to about 70 pounds per square inch for from about 0.1 to about 50 seconds, thereby producing a hydrogen-containing gas; and

(c) purifying said hydrogen-containing gas.

12. The process as recited in claim 11, wherein said water-containing gas is steam.
13. The process as recited in claim 12, wherein said methane and said steam are maintained within said fuel processor assembly at a pressure of from about 15 to about 60 pounds per square inch.
14. The process as recited in claim 13, wherein said methane and said steam are maintained within said fuel processor assembly at a temperature of from about 600 to about 850 degrees Celsius.
15. The process as recited in claim 14, wherein said methane and said steam are maintained within said fuel processor for from about 1 to about 10 seconds.